REMARKS

Claims 1 through 8 are pending in this application. Claims 3 and 4 have been amended and new claims 5 through 8 added. Care has been exercised to avoid the introduction of new matter. Adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure, noting that claims 3 and 4 have been amended to confine their respective dependencies to claim 1, claim 5 represents former claim 3 dependent on claim 2, claims 6 through 8 represent former claim 4 dependent on claims 2, 3, and 5, respectively, all of which were originally claimed. Accordingly, Applicants submit that the present Amendment does not generate any new matter issue.

Abstract

The Examiner objected to the Abstract identifying perceived informalities. In response the Abstract has been replaced with an Abstract consistent with the Examiner's suggestions. Accordingly, withdrawal of the objection to the Abstract is solicited.

Claim Objection

The Examiner objected to claim 4, asserting improper multiple dependency. Claim 4 has been amended to correct the multiple dependency issue by confining claim 4 to claim 1, and introducing claims 6, 7, and 8 based upon original claim 4. Accordingly, withdrawal of the objection to claim 4 is solicited.

Claims 1 through 3 rejected under 35 U.S.C. § 102 for lack of novelty as evidenced by each of Hill and Eisenmann.

In the statement of the rejection the Examiner asserted that each of Hill and Eisenmann discloses an inner rotor for an internal gear pump corresponding to that claimed. In support of that determination the Examiner asserted that the teeth of the inner rotors of Hill and Eisenmann include an engaging portion configured to engage an outer rotor and defined by an **involute curve**, referring to Fig. 3 of Hill and Fig. 4 of Eisenmann. This rejection is traversed as factually inaccurate.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the identical disclosure in a single reference of each element of a claimed invention such that the identically claimed invention is placed into the recognized possession of one having ordinary skill in the art. *Dayco Prods., Inc. v. Total Containment, Inc. 329 F.3d 1358, 66 USPQ2d 1801 (Fed. Cir. 2003); Crown Operations International Ltd. v. Solutia Inc., 289 F.3d 1367, 62 USPQ2d 1917 (Fed. Cir. 2002).* When imposing rejection under 35 U.S.C. § 102 for lack of novelty, the Examiner is required to specifically identify wherein an applied reference identically discloses each and every feature of a claimed invention, particularly when such is not apparent as in the present case. *In re Rijckaert, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993); Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984).* That burden has not been discharged. Indeed, there is a fundamental difference between the claimed inner rotor and the rotors disclosed by Hill and Eisenmann that scotches the factual determination that either Hill or Eisenmann discloses an inner rotor identically corresponding to that claimed.

Specifically, the Examiner erred in factually determining that each of Hill and Eisenmann discloses an inner rotor comprising *inter alia*, an engaging portion configured to engage an outer rotor as defined by **involute curves**.

Hill

As clearly disclosed on page 2 of Hill, left column, lines 6 through 19, the teeth of the inner rotor illustrated in Fig. 3 comprises addendum sections 25, or the portions beyond the pitch circle 26 and dedendum sections 28, or the portions inside the pitch circle 26. The addendum sections 25 are formed on **epicycloidal curves**. The dedendum sections 28 are formed on **hypocycloidal curves**. The addendum sections 25 are directly connected to the dedendum sections 28. Accordingly, there are **no** engaging portions or any other portions formed by **involute** curves between the addendum sections 25 and dedendum sections 28.

Eisenmann

Fig. 2 of Eisenmann is an enlarged view of Fig. 4. It should be apparent from Fig. 2 and the paragraph beginning at line 34, column 8, that the teeth of the inner rotor of Eisenmann are also formed solely by **cycloids**. It is not apparent and the Examiner did not point out wherein any portions of the teeth are formed by **involute curves**.

Involute Curves vs. Cycloidal Curves.

As one having ordinary skill in the art would have recognized, an involute curve is a curve traced by one end of a straight rod when the rod is rolled on a base circle without slipping. The Examiner's attention is invited to Fig. 2-4 on the attached publication (Exhibit A).

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On the other hand, as one having ordinary skill in the art would have recognized, particularly from page 2 of Hill, left hand column, lines 6 through 19, an **epicycloidal curve** is a curve traced by a point on the circumference of a circle, such as circle 27, which rolls up the convex surface of another circle, such as pitch circle 26. A **hypocycloidal curve** is a curve traced by a point on the circumference of a circle, such as circle 27, which rolls upon the inside surface of another circle, such as pitch circle 26.

It is, therefore, apparent that one having ordinary skill in the art would have understood that an involute curve is completely different from a cycloidal curve, such as an epicycloidal curve or a hypocycloidal curve.

The above argued structural difference between the claimed inner rotor and the inner rotor disclosed by each of Hill and Eisenmann undermine the factual determination that either Hill or Eisenmann discloses an inner rotor identically corresponding to that claimed. *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc., 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 230 USPQ 81 (Fed. Cir. 1986).* Applicants, therefore, submit that the imposed rejection of claims 1 through 3 under 35 U.S.C. § 102 for lack of novelty as evidenced by Hill or Eisenmann is not factually viable and, hence, solicit withdrawal thereof.

Claims 4 through 8.

Claims 4 through 8 depend directly or indirectly upon independent claim 1, the patentability of which has been argued supra. Accordingly, claims 4 through 8 are clearly free of the applied prior art.
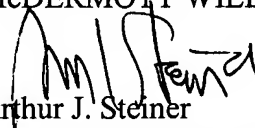
Based upon the foregoing it should be apparent that the imposed objections and rejections have been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.
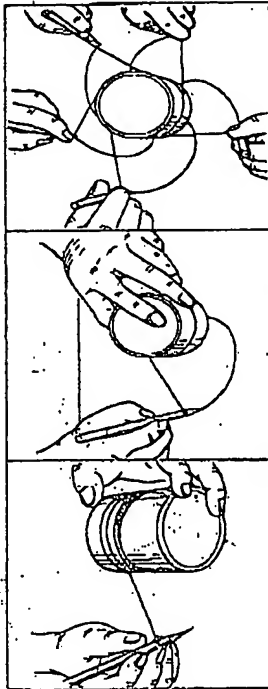
Respectfully submitted,

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EXHIBIT A

歯形の代表――インボリュート歯形

ないで回してゆくと、その棒の先端が描く（曲線もインボリュート曲線となります。）

これは、糸をゆるめないで、まっすぐに引張ってゆくからです。その糸の代わりに、棒を使ったわけですから、当然、インボリュート曲線となるわけです。

さて、いままでもとの、ころんだ円筒に糸を巻き付け、図2-5のように円筒を8等分して付け、そこに鉛筆を8本付け、8本のインボリュート曲線を描きます。それができたら、糸の巻きかたを逆にして、同様に曲線を8本描いてください。いかがですか。歯数8枚の歯車が描けたでしょう（図2-6）。

図2-5

8本のインボリュート曲線

円周を8等分する

図2-6

反対に糸を巻いた8本のインボリュート曲線

これでインボリュート曲線はどんな曲線かが、わかりましたが、それでは、なぜ、歯車にこの曲線を使うのでしょうか。それを考えてみましょう。

歯形曲線には、なぜインボリュート曲線が使われるのか

もちろん、ぐあいがよいから使われるのですが、しかし、ほかの歯形（たとえば図2-7のような四角形）の歯車でも、なぜぐあいがわるいのか、それから考えてみましょう。

四角形の歯形歯車

図2-7をごらんください。回す方の歯車をO、回される方をO′とします。OO′のかみ合い...を、分析して

図2-7

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図2-3

インボリュート？ サテ開いたような、開かないような、そうです、開いたような、といえばインボリュート関数というのがありますネ。あのインボリュートです。なるほど...と聞いたはずです。しかし、歯車以外では、マァ関かないことばです。曲線のなまえとは、わかったとして、それでは、いったいどんな曲線でしょうか。

図2-3を見てください。図のように、丸い筒に糸を巻きつけ、その糸の先に鉛筆を付けておきます。そのとき糸をひっぱりながらその糸をほどいていきます。そのとき鉛筆で書かれた曲線、これがインボリュート曲線です（中央の図）。つまり歯車のこの歯形曲線はこの曲線なのです（インボリュート、involute）という英語で、ふつうは漸伸線あるいは伸開線という専門的な意味もあります）。

いま、鉛筆は糸の先に付ける、といいましたが、実はどこへ付けておいても...いので、いっぺんに5本付けておいたら、5本の鉛筆が描く曲線が...。インボリュート曲線になり、しかも同じ形の曲線になります。ほかの円筒でも、その直径さえ等しければ、どのインボリュート曲線でも同じ形のとれなります。

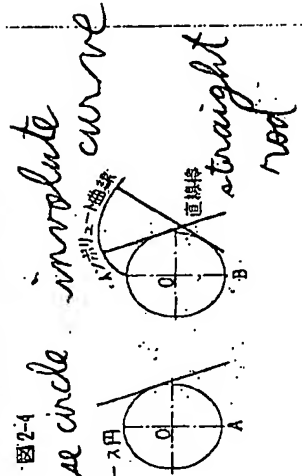ニート曲線は（このときその円筒のことを、基礎円とか、ベース円、といいます）。
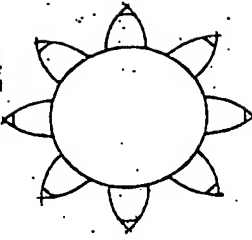
また、図2-4-Aのベース円に接した直線をも、図2-4-Bのようにすべらせ

図2-4

base circle

involute curve

straight rod

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